

SUBMARINE CABLE SINGLE ARMOR 120 KN

AR-SUB-SA-120KN-xxF-G652D

OPTICAL FIBRE CABLE TECHNICAL SPECIFICATION

1. General

1.1 Scope

This Specification covers the design requirements and performance standard for the supply of optical fibre cable in the industry. ARTIC ensures a stable quality control system for our cable products through several programs including ISO 9001, ISO 14001 and ROHS.

Cable type	Application
AR-SUB-SA-120KN-xxF-G652D	Under the River/Lake/Sea

xx Represents the fibre counts of the cable.

1.2 Reference

The cable offered by ARTIC are designed, manufactured and tested according to the standards as follows:

IEC 60793-1-1	Optical fibres - Part 1-1: Measurement methods and test procedures - General and guidance
IEC 60793-2	Optical fibres - Part 2: Product specifications - General
IEC 60793-2-50	Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres
IEC 60794-1-1	Optical fibre cables - Part 1-1: Generic specification -General
IEC 60794-1-2	Optical fibre cables - Part 1-2: Generic specification -Basic optical cable test procedures - General guidance
IEC 60794-1-21	Optical fibre cables - Part 1-21: Generic specification - Basic optical cable test procedures - Mechanical tests methods
IEC 60794-1-22	Optical fibre cables - Part 1-22: Generic specification - Basic optical cable test procedures - Environmental tests methods
IEC 60794-1-23	Optical fibre cables - Part 1-23: Generic specification- Basic optical cable test procedures - Cable element test methods
IEC 60794-3	Optical fibre cables - Part 3: Sectional specification -Outdoor cables
IEC 60794-3-30	Optical fibre cables - Part 3-30: Outdoor cables -Family specification for optical telecommunication cables for lakes, river crossings and coastal application
ITU-T G.652	Characteristics of a single-mode optical fibre and cable (C/D:Non-dispersion shifted single-mode optical fibre with extended wavelength)
ITU-T G.976	Test methods applicable to optical fibre submarine cable systems

1.3 Life Time

Optical fibre cables supplied in compliance with this specifications is capable to withstand the typical service condition for a period of twenty-five (25) years without detriment to the operation characteristics of the cable.

1.4 Application

The single armoured lightweight cable is applicable to specific areas where a certain tensile performance is required during laying, recovery and operation.

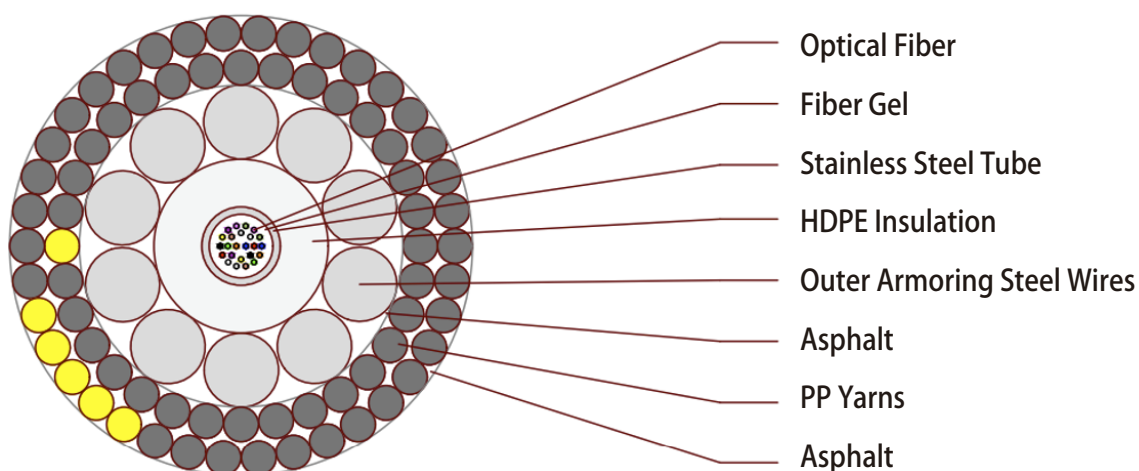
Item	Value
Operation temperature	In water 0°~+30 °C, In air -20°~+60 °C
Installation temperature	-15 °C~+45 °C
Storage temperature	-30 °C~+60 °C
Water depth (max.)	2000m

2. Optical Cable

2.1 Technical Characteristics

- The unique tube welding and wire armoring technology provide the fibres with enough space and bending endurance, which ensure good optical property of the fibres in the cable.
- Accurate process control ensures good mechanical and temperature performance.
- High quality raw material guarantees the long service life of cable.

2.2 Cross Section of Cable



2.3 Dimensions and Descriptions

The standard optical cable structure is shown in the following table, other structure and fibre count are also available according to customer requirements.

Item	Physical Characteristics	Unit	Nominal Value	
Structure & Parameter	Fibre count in single FIMT	No.	24-60	96
	FIMT O.D.	mm	3.7	5.0
	HDPE Insulation O.D.	mm	8.2±0.2	8.2±0.2
	Outer Armoning Steel Wires	mm x No.	Φ3.5x10	Φ3.5x10
	PP Yarns Sheath Thickness	mm	3.6	3.6
	Cable O.D.	mm	Φ22.4±1.5	Φ22.4±1.5
	Weight in air, approximately.	kg/m	1.07	1.07
	Weight in seawater, approximately.	kg/m	0.7	0.7

2.4 Main Mechanical And Electrical Performance

Item	Physical Characteristics	Unit	Nominal Value
Nominal Specification	Minimum Breaking Load (UTS)	kN	120
	Nominal Transient Tensile Load (NTTS)	kN	78
	Nominal Operating Tensile Load (NOTS)	kN	48
	Nominal Permanent Tensile Load (NPTS)	kN	30
	Minimum Bending Radius without Tension	m	1.0
	Minimum Bending Radius under Tension	m	1.5
	Crush (IEC-60794-1-21E3A)	kN/100mm	15
	Impact (IEC-60794-1-21-E4)	J	200

3. Optical Fibre

3.1 Fibre Identification

The color code of fibres will be identification in accordance with the following color sequence, other sequence also is available.

Fibre color code

Fibre No. 1-12	1	2	3	4	5	6
	● Blue	● Orange	● Green	● Brown	● Grey	○ White
	7	8	9	10	11	12
	● Red	● Black	● Yellow	● Violet	● Pink	● Aqua

Fibre No. 13-24	13	14	15	16	17	18
	● S100 Blue	● S100 Orange	● S100 Green	● S100 Brown	● S100 Grey	○ S100 White
	19	20	21	22	23	24
	● S100 Red	● S100 Black	● S100 Yellow	● S100 Violet	● S100 Pink	● S100 Aqua

Fibre No. 25-36	25	26	27	28	29	30
	● D150 Blue	● D150 Orange	● D150 Green	● D150 Brown	● D150 Grey	○ D150 White
	31	32	33	34	35	36
	● D150 Red	● D150 Black	● D150 Yellow	● D150 Violet	● D150 Pink	● D150 Aqua

Fibre No. 37-48	37	38	39	40	41	42
	● S60 Blue	● S60 Orange	● S60 Green	● S60 Brown	● S60 Grey	○ S60 White
	43	44	45	46	47	48
	● S60 Red	● S60 Black	● S60 Yellow	● S60 Violet	● S60 Pink	● S60 Aqua

Fibre No. 49-60	49	50	51	52	53	54
	● S150 Blue	● S150 Orange	● S150 Green	● S150 Brown	● S150 Grey	○ S150 White
	55	56	57	58	59	60
	● S150 Red	● S150 Black	● S150 Yellow	● S150 Violet	● S150 Pink	● S150 Aqua

Note:**S:** Single Ring**D:** Double Ring**60-100-150-200-250:** Distance Between Adjacent Rings (mm)

3.2 Fibre Characteristic

G.652.D Non-dispersion shifted single-mode fibre with extended wavelength.

Category	Description	Specification
Geometric characteristic	Cladding diameter	125 ±0.7µm
	Cladding non circularity	≤ 1.0%
	Core/cladding concentricity error	≤ 0.6µm
	Coating diameter (uncoloured)	235 to 255µm
	Coating diameter (coloured)	235 to 265µm
	Coating/cladding concentricity error	≤ 12 µm
	Fibre excess length	2~3%
Transmission characteristic	Attenuation coefficient at 1310nm	≤0.35 dB/km (cabled)
	Attenuation coefficient at 1550nm	≤0.21 dB/km (cabled)
	Mode field diameter @1310nm	9.1±0.4µm,
	Mode field diameter @1550nm	10.4±0.5µm,
	Cable cutoff wavelength (λ cc)	≤1260nm
	Zero-dispersion wavelength (λ 0)	1300 ≤ λ 0 ≤1324 nm
	Zero Dispersion Slope (S0) at λ 0	≤0.092 ps/(nm2.km)
	Dispersion coefficient at 1285~1340 nm	-3.5~+3.5 ps/(nm.km)
	Dispersion coefficient at 1550 nm	≤18 ps/(nm.km)
	Dispersion coefficient at 1625 nm	≤22 ps/(nm.km)
	Maximum individual fibre PMD	≤ 0.2 ps/√ km
	Link design value, PMDQ (Q=0.01%, N=20)	≤ 0.1 ps/√ km
	Macrobending loss (100 turns, 30mm radius)	≤ 0.1dB at 1625 nm
Mechanical characteristic	Proof stress level	≥ 200kpsi (1.38Gpa)
	Coating strip force	1.0N≤ Fave≤5.0N and 1.0N≤Fpeak≤8.9N
	Tensile strength (median) for 0,5 m specimen length	F50% ≥ 3.8Gpa
	Stress corrosion susceptibility parameter(nd)	≥ 20
	Fibre curl radius	≥ 4 m
Environmental characteristic	Damp heat	≤ 0.05 dB/km @1550 and 1625nm
	Dry heat	≤ 0.05 dB/km @1550 and 1625nm
	Change of temperature	≤ 0.05 dB/km @1550 and 1625nm
	Water immersion	≤ 0.05 dB/km @1550 and 1625nm

4. Packaging and Drum

4.1 Cable Sheath Marking

For installation purpose, a few yellow yarns are inserted in the black yarn layer. A tape with length marking is applied every 500m on the cable sheath.

Outer sheath marking legend can be changed according to user's requests.

4.2 Cable-end package

Both ends of the cable will be sealed with suitable plastic caps to prevent the entry of moisture during shipping, handling and storage.

4.3 Reel Length

Determined according to customer needs.

4.4 Delivery Method

According to the length of each segment, The cables are packed in steel drums, palles, containers, cabin of laying Ship , or according to customers' reasonable requirements.